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MILWAUKEE GENERAL MITCHELL INTERNATIONAL AIRPORT

CLASS 1 EROSION MAT TEST SITE

FINAL REPORT

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16. Abstract

A Report of rolled erosion control products. Products were installed at the Milwaukee Mitchell Airport in June of 1998. Fourteen (14) products were installed and evaluated over a one (1) year period. The products were evaluated for sediment loss, vegetative density, durability of the mats, degradation of mat both photogredation and biodegredation. Mats were also evaluated on their ability to withstand maintenance efforts especially the ability to stay in intimate contact with the ground during mowing operations.
Specification changes concerning airport use of erosion mats was recommended to the Wisconsin Department of Transportation. Approval and disapproval of products to the Wisconsin Department of Product Acceptability List was made along with specification and installation changes.

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CLASS I EROSION MAT TEST SITE REPORT

FINAL REPORT NUMBER: WI-08-00
WisDOT Highway Research Study # 98-07

by

Gilbert j. Layton
Transportation District 4 Project Development
and
the Erosion Control Storm Water Committee

for

WISCONSIN DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION INFRASTRUCTURE DEVELOPMENT
BUREAU OF HIGHWAY CONSTRUCTION
PAVEMENTS SECTION
TECHNOLOGY ADVANCEMENT UNIT
3502 KINSMAN BLVD., MADISON, WI 53704-2507

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BACKGROUND

The Wisconsin Department of Transportation (WisDOT) Erosion Control and Storm Water (ECSW) Committee, along with the Bureau of Aeronautics entered into this study to evaluate the performance of several brands of erosion mat.

OBJECTIVE

The objective of this study was to determine the performance of several new products not currently on WisDOT's Erosion Control Product Acceptability List (PAL), and also some products that were already on the PAL. One problem that has been apparent in the past has been the ability of an erosion mat to be installed late in the fall and survive through the winter and following spring until vegetation takes hold. Another objective of this test was to determine how quickly these products could be mowed and if that mowing would pose an equipment maintenance problem at the time that the vegetation, or duration of time from installation, would normally require mowing. Some products perform better when installed during the summer months at such time that vegetation can readily take hold, but perform rather poorly when expected to survive through winter months after a late fall installation.

Previous tests have confirmed the problem associated with plastic netted products not degrading, then wrapping around mowing equipment often damaging the equipment in the process. Some communities refuse to allow plastic netted erosion mats to be used along roadways, that they maintain, for this reason.

The present WisDOT Class 1, Urban erosion mat specification allows only biodegradable netted products to be used. This product has performed well when installed both early or late in the construction season, and has over wintered well. It lays flush with the soil, not tenting with the vegetation growth. Very little tear up during the first mowings have been observed, and then nothing that would damage a mower. The product, not being plastic, would not burn into a mowers bearings. Most manufacturers refer to these products as biodegradable or bio netted. Several of these products were included in the test site.

Several of the products tested were new photo degradable plastic netted products which have been developed to break down more quickly than regular plastic netted products that actually have UV inhibitors incorporated in them to prevent breakdown. For the purpose of reference in this report, refer to these products as "quick mow".

EVALUATION

The test site was a taxi area of a new runway constructed at the General Mitchell International Airport at Milwaukee Wisconsin. The products were installed 2 roll widths deep (back from the pavement), and parallel to the taxiway. The site was exposed to high winds due to jet engine blast, wing vortices, its being such an open area, and flat terrain. As per the specifications, already approved for this project, the products were all installed using metal staples, and entrenching was done along the edge of pavement.

Products were evaluated for durability and performance through the winter, vegetative density, and mowability.

Evaluations were conducted several times between the installation date and June 21, 1999. The evaluating committee consisted of members of the ECSW/PAL Committee, as well as engineering and maintenance staff from Milwaukee Mitchell Airport.

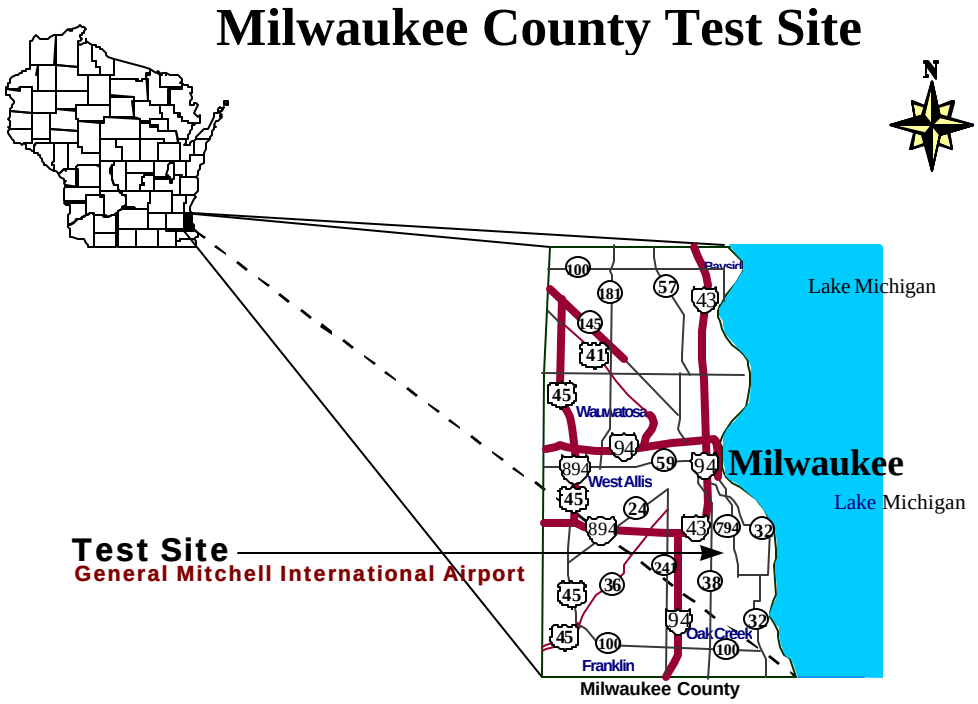

Figure1 Project Location

The test site contained the following products which were installed on November 2, 1998.

Site	Product	Manufacturer	Type
A	S75BN	North American Green	Bio net straw, single net
B	DS75	North American Green	Quick mow Straw, single net
C	S150BN	North American Green	Bio net straw, double net
D	DS150R	North American Green	Quick mow straw, double net
E	Earth Guard	Research Products Corp.	Non netted paper
F	ENCS2	Bon Terra	Bio Net straw, double net
G	ENS1	Bon Terra	Bio net straw, single new
H	ENC2	Bon Terra	Bio net coconut, double net
I	Proseed	Proseed USA	Non netted bonded fiber
J	Curlex 1	American Excelsior	Quick mow excelsior, 1 net
K	SF1D	Bon Terra	Quick mow straw, single net
L	Curlex II	American Excelsior	Quick mow excelsior, 2 nets
N	HP90	Bon Terra	Non netted coconut
M	S75	North American Green	Plastic netted straw, 1 net

Table 1

The following products failed based upon performance during the test period.

E. Earth Guard, due to wind damage during the test. The product was judged not strong enough to withstand normal winds. This product had previously been approved for use in urban areas, but had also posed a problem there, particularly with late fall installations, and had been removed from the PAL.

I. Proseed, due to damage from foot traffic and wind. This damage took place the following day after installation. The product had to be replaced with another product by the contractor. This product had also failed two other tests under urban conditions. It was by far the weakest product tested.

N. HP90, This product was failed because of its inability to allow vegetation to adequately grow through it at the completion of the test.

CONCLUSIONS

1. The quick mow products (sites B, D, J, K & L)all passed the evaluations, but there was concern that the mats lost considerable strength after their designed (6 to 8 week) life. Midwinter visits to the site showed the netting to be getting quite friable, and late spring visits showed the netting to have lost enough strength to pose a potential risk of mat failure. There was concern that the mat might fail completely prior to vegetation establishment. Had it not been for the flat slopes encountered, and the fact that wind blown sediment, deposited in the mat, helped to hold the products together, these products would likely have not survived the winter. Based on the manufacturers own data that these products only last from 6 to 8 weeks, and this test, these products were conditionally approved. That condition being that they may not be installed after September 1st in any given year. It was felt that adequate time must be allowed for these products to establish vegetation prior to winter, if they are to work properly. These products were placed in the Class 1, Type A category of WisDOT's Erosion Control PAL, with the above condition/restriction.

It should be noted that due to the lack of shear data , and the fact that the test site did not have channel applications, the double netted products were quick mow products were not placed in the Class I Type B category. The evaluating committee commends the manufacturers for the development of these new products. They do appear to have the potential to eliminate the complaints of netting being torn up on mats that have been installed years earlier. However WisDOT's specifications must ensure that the products will perform adequately, and to that end the products should not be installed after such time as vegetation will be unlikely to establish prior to the designed life expectancy of the netting.

Also, it was determined that these products did not degrade rapidly enough to allow mowing in the desired 10 days to 2 weeks associated with WisDOT's Class 1, Urban category, which is used for areas where lawns or urban type vegetation is to be established.

2. The double netted products all performed better, than the single netted products, in this high wind, airport environment. It was the recommendation of the evaluating committee that only double netted products be approved for airport use. The single netted products all experienced separation or redistribution of the parent material under the net.

3. When mowing was first done, the spring following the installation, many of the plastic netted products, including the quick mow products, clumped and balled the netting. These clumps were left near the runway, which could pose a problem for aircraft engine intake. The biodegradable netted products were the only products to perform acceptably given the safety

and liability concerns associated with an airport within the 10 foot clear zone of runway and taxiways.

4. The specifications for the airport construction project allowed metal staples to be used to install the erosion mats. Many of these staples were not installed flush with the ground, as is generally the case. Upon completion of the first mowing, many of these staples were found on the pavement of the runway. This could pose a significant risk to aircraft tires and intake into aircraft engines. It was the recommendation of the evaluating committee that only WisDOT approved biodegradable urban staples be approved for airport use.

RECOMMENDATIONS

The evaluating committee formulated the following recommendations for specification changes based on the above conclusions.

1. That the Quick Mow products all be placed on the WisDOT Erosion Control PAL with a restriction that they not be installed after September 1st of any given year.

2. That only double netted products be approved for airport use.

3. That WisDOT specifications for all transportation facilities require entrenchment of erosion mats placed within 5 feet of live traffic lanes or airport runways/taxiways.

4. That only WisDOT Class 1, Urban mats, that are double netted, be allowed within 10 feet of an airport runway/taxiway, and that installation be done with approved WisDOT biodegradable staples.